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EXAMINER

GODENSCHWAGER, PETER F

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.



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### **DETAILED ACTION**

Applicant's reply filed September 7, 2010 has been fully considered. Claims 8 and 11 are amended, and claims 8 and 11-14 are pending.

#### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Braden et al. (US Pat. No 5,965,785) in view of Vercammen (US Pat. No. 7,279,089).

Braden et al. teaches a process of adding amines to a liquid (that contains water and magnesium and calcium chlorides) that comes in contact with an atmospheric pipestill tower

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(atmospheric distillation column) in an amount to keep the bulk water condensate (which condenses at the top of the distillation column) at a pH of 5.5-6.5 (1:14-24, 2:10-30, 3:17-25, and 5:3-12). Braden et al. further teaches that the process prevents/inhibits corrosion (7:65-67).

Braden et al. does not teach the method where ( $\beta$ -hydroxyethyl) trimethylammonium hydroxide is added in place of the amines (i.e. only a compound of formula (1) is added). However, Vercammen teaches the use of choline, ( $\beta$ -hydroxyethyl) trimethylammonium hydroxide, a compound of general formula (1) where  $R^1$ ,  $R^2$ , and  $R^3$  are methyl groups (hydrocarbon radicals with 1 carbon atom) and  $n=2$ , as a corrosion inhibitor for metals in oil refinery systems (1:9-23 and 2:63-3:10). Braden et al. and Vercammen are analogous art because they are concerned with the same field of endeavor, namely the prevention of corrosion in oil refinery process through the addition of amines. At the time of the invention, a person of ordinary skill in the art would have found it obvious to use the choline of Vercammen to replace the amines in the method of Braden et al. and would have been motivated to do so because Vercammen teaches that while other amines form a sticky solid when quenching acids which further lower the pH of the system, choline (the additive) does not, thus preventing secondary corrosion by amine-acid by products (2:35-50; 3:25-31). While neither Braden et al. nor Vercammen explicitly teach that the method prevents formation of hydrogen chloride, or results in a reaction of ( $\beta$ -hydroxyethyl) trimethylammonium hydroxide with magnesium chloride and calcium chloride, the references render obvious all of the claimed ingredients, process steps and process conditions. Therefore, the claimed result would inherently be achieved by the method as claimed and rendered obvious. If it is the Applicant's position that this would not be the case: (1) evidence would need to be presented to support applicant's position; and (2) it would be the

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Office's position that the application contains inadequate disclosure that there is no teaching as to how to obtain the claimed properties with only the claimed ingredients, process steps and process conditions.

Claims 11-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Braden et al. (US Pat. No 5,965,785) in view of Vercammen (US Pat. No. 7,279,089).

Regarding Claim 11: Braden et al. teaches a process of adding amines to a liquid (that contains water and magnesium and calcium chlorides) that comes in contact with an atmospheric pipestill tower (atmospheric distillation column) where the amine may be added to the crude oil coming into the tower (which is after the desalter, see Fig. 1) (Fig. 1, 1:14-24, 2:10-30, 4:66-5:12). Braden et al. further teaches that the process prevents/inhibits corrosion (7:65-67).

Braden et al. does not teach the method where ( $\beta$ -hydroxyethyl) trimethylammonium hydroxide is added in place of the amines (i.e. only ( $\beta$ -hydroxyethyl) trimethylammonium hydroxide is added). However, Vercammen teaches the use of choline (( $\beta$ -hydroxyethyl) trimethylammonium hydroxide), as a corrosion inhibitor for metals in oil refinery systems (1:9-23 and 2:63-3:10). Braden et al. and Vercammen are analogous art because they are concerned with the same field of endeavor, namely the prevention of corrosion in oil refinery process through the addition of amines. At the time of the invention, a person of ordinary skill in the art would have found it obvious to use the choline of Vercammen to replace the amines in the method of Braden et al. and would have been motivated to do so because Vercammen teaches that while other amines form a sticky solid when quenching acids which further lower the pH of the system, choline (the additive) does not, thus preventing secondary corrosion by amine-acid

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by products (2:35-50; 3:25-31). While neither Braden et al. nor Vercammen explicitly teach that the method prevents formation of hydrogen chloride, or results in a reaction of ( $\beta$ -hydroxyethyl) trimethylammonium hydroxide with magnesium chloride and calcium chloride, the references render obvious all of the claimed ingredients, process steps and process conditions. Therefore, the claimed result would inherently be achieved by the method as claimed and rendered obvious. If it is the Applicant's position that this would not be the case: (1) evidence would need to be presented to support applicant's position; and (2) it would be the Office's position that the application contains inadequate disclosure that there is no teaching as to how to obtain the claimed properties with only the claimed ingredients, process steps and process conditions.

Regarding Claim 12: Braden et al. does not teach the method where the amine is kept at 0.1-5 times the amount of salt content in the oil. However, it is common practice in the art to optimize result effective variables such as relative concentration of amine to salt in the crude oil distilling process (See MPEP 2144.05). At the time of the invention, a person of ordinary skill in the art would have found it obvious to optimize the relative amount of amine to salt in the crude oil distillation process and would be motivated to do so because, as Braden et al. teaches, the salt is directly responsible for producing the corrosive acid in the process (2:21-26). Therefore, based on the level of corrosion resistance required, one would want to adjust the acid quenching compound (amine) accordingly.

Regarding Claims 13 and 14: Braden et al. further teach measuring the pH of the condensate (condensed water) and adjusting the amount of amine accordingly (6:43-58). Braden

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et al. specify a pH range for the water condensate of the overhead accumulator of 5-6.5 as being corrosion safe (6:53-58).

### ***Response to Arguments***

Applicant's arguments filed September 7, 2010 with respect to claim 8 and 11 and the newly added amendment that the ( $\beta$ -hydroxyethyl) trimethylammonium hydroxide reacts with magnesium chloride and calcium chloride have been considered and sufficiently responded to in the new grounds of rejection above.

Applicant's arguments regarding claims 8 and 11-16, specifically regarding the claim of unexpected results, have been fully considered but they are not persuasive.

Applicant cites Table 2 on page 12 of the arguments (a reordered version of Table 2 on Pg. 32 of the original specification) that shows that the presently claimed quaternary ammonium compound, choline (( $\beta$ -hydroxyethyl) trimethylammonium hydroxide) and four other bases listed in descending order of their  $K_b$  value. Applicant argues that it is unexpected that choline would raise the pH of the boiler water more efficiently than the other compounds. However, choline is described by Vercammen as a strong base (3:10-15). Table 2 compares choline, a strong base, to four weak bases, in their ability to raise the pH of an aqueous solution. It would not be unexpected to anyone of ordinary skill in the art that a strong base will raise the pH of an aqueous solution more than a weak base. This is exactly what defines a strong base relative to a weak base. The Examiner acknowledges that cyclohexylamine appears to be an outlier in the trend of  $K_b$  vs. the ability of the compound to raise pH. However, the overall trend as seen in comparing Tables 1 and 2 show that the ability to raise pH is directly dependent on the  $K_b$  value

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(strength of the base). Certainly Kb value is not the only factor for consideration, and other factors must be considered including volatility of the base and the water solubility of the base. When taking into account the water miscibility of the compounds, it is not entirely surprising that cyclohexylamine (the only hydrophobic compound on the list) requires a much higher weight percent to be effective when mixing with water in view of its much lower water solubility.

In addition, it is noted that the data of Tables 2, 3 and 5 of the specification present results from experiments that are not commensurate in scope with the claimed invention [see MEPE 716.02(d)]. Specifically, the results of Tables 2 and 3 do not relate to a method of preventing corrosion of metal in an atmospheric distillation column. With regards to Table 5, it is noted that the experiment (Test Example 1 of the specification) uses only one amount of the base, whereas at least independent claims 8 and 11 do not limit the amount of ( $\beta$ -hydroxyethyl) trimethylammonium hydroxide added. Furthermore, the procedure of Test Example 1 does not add only ( $\beta$ -hydroxyethyl) trimethylammonium hydroxide, but adds the compound as an aqueous solution.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after



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the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

### *Correspondence*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to PETER F. GODENSCHWAGER whose telephone number is (571)270-3302. The examiner can normally be reached on Monday-Friday 7:30-4:30 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Eashoo can be reached on (571) 272-1197. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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Examiner, Art Unit 1767

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